

**SUBSOLAR ENERGY PTY (LTD) SITE ASSESSMENT OF  
THE REMAINING EXTENT OF PORTION 1 OF THE FARM  
LIME BANK NO. 471, NORTHERN CAPE PROVINCE,  
SOUTH AFRICA**

APRIL 2016



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## 1. Executive Summary

The Remaining Extent of Portion 1 of the farm Lime Bank No. 471, located near Kathu is owned by Hendrik van der Merwe. The farm is approximately 1295.52 hectares (ha), within the Northern Cape Province, Registration Division Kuruman, South Africa (Figure 1). The study area falls within the John Taolo Gaetsewe District Municipality, located in the Gamagara Local Municipality.

The landscape consists of level plains with some relief. The farm is situated south of the R380 for access to site. For connection to the grid, the site is south of the Ferrum/Fox 132 [kV] power line. The site has low agricultural potential as well as low to moderate potential grazing capacity. From a hydrological perspective, a few pans were identified on site. This site has favourable conditions for a solar power plant due to its environmental conditions, weather conditions (i.e. Kathu has high solar radiation levels) as well as good site access.

The site has good solar radiation, ecology and relative flat terrain (refer to Figures below). Three EIA's have been conducted within 5 km of the site. Some parts of this site may not be suitable due to issues found on it namely structures, rock outcrops, pans etc.

## 2. The Remaining Extent of Portion 1 of the farm Lime Bank No. 471

The Remaining Extent of Portion 1 of the farm Lime Bank No. 471 is located within the Northern Cape Province, Registration Division Kuruman, South Africa and falls within the John Taolo Gaetsewe District Municipality, located in Gamagara Local Municipality.

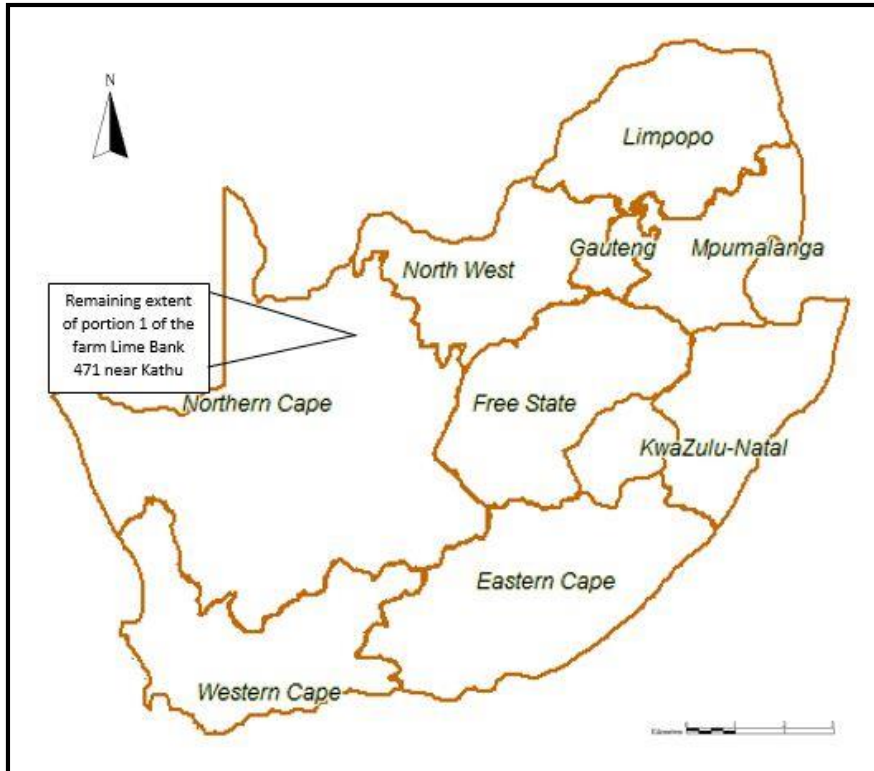


Figure 1: Location of the site

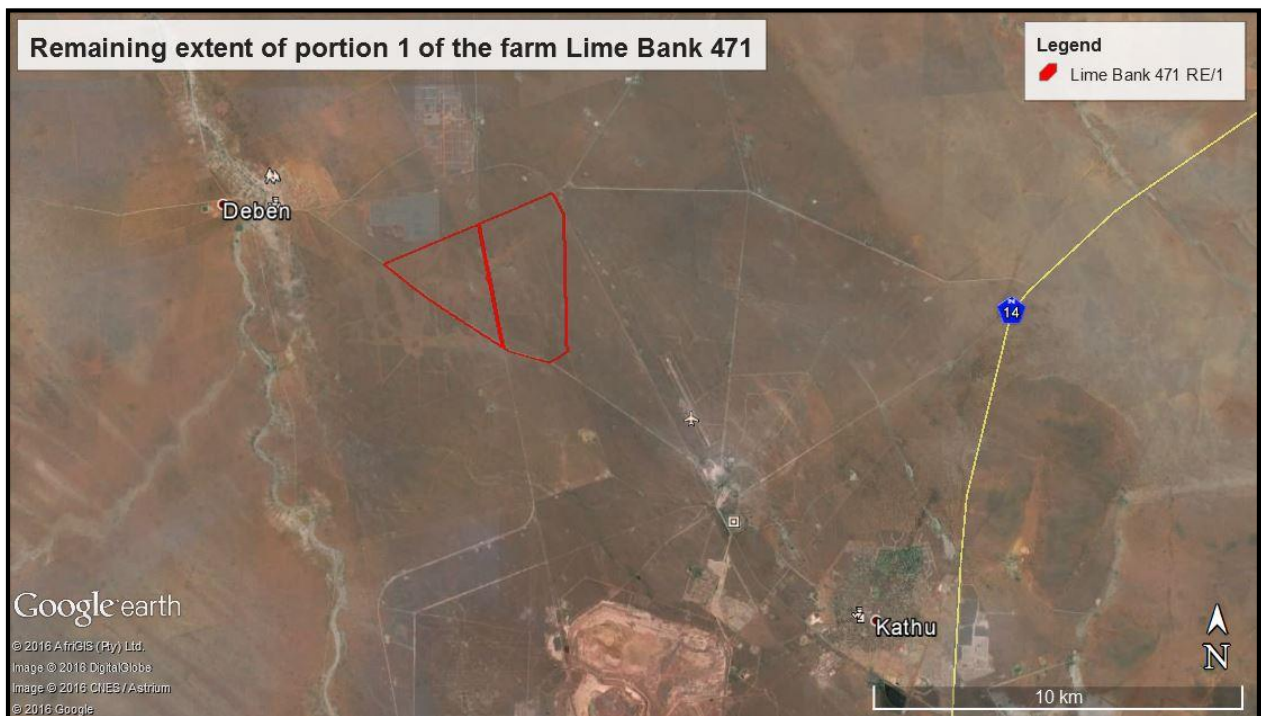


Figure 2: Land Portion of farm (Google Earth)

### 3. Power lines and Substations

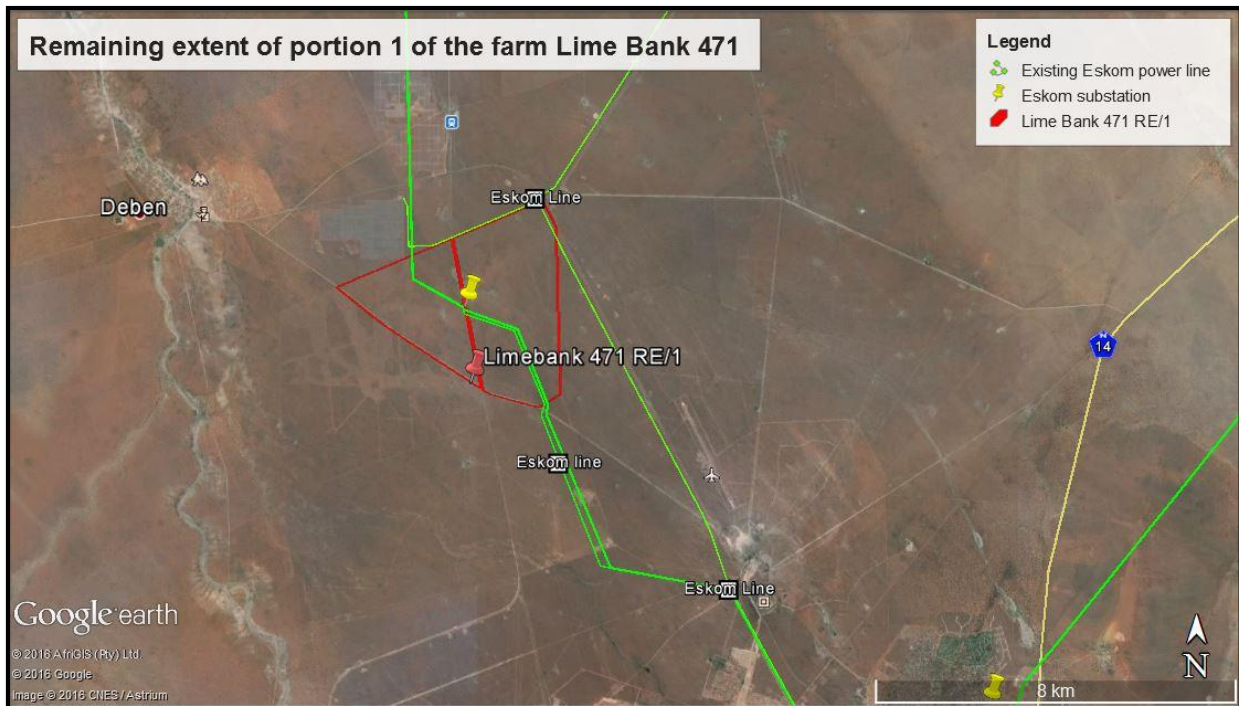


Figure 3: Power lines and substations

#### 3.1. Substations near site

- Wincanton Traction Substation  
Voltage: 132.0 [kV]

#### 3.2. Power Lines near site

##### FERRUM - FOX

Description: Ferrum -Fox  
Voltage: 132.00 [kV]

##### FERRUM - WINCANTAN

Description: Ferrum - Wincanton  
Voltage: 132.00 [kV]  
Length: 18104.07 m

##### MAMATWANE-WINCANTAN

Description: Mamatwane - Wincanton  
Voltage: 132.00 [kV]  
Length: 23574.28 m



#### 4. Farm portions and size

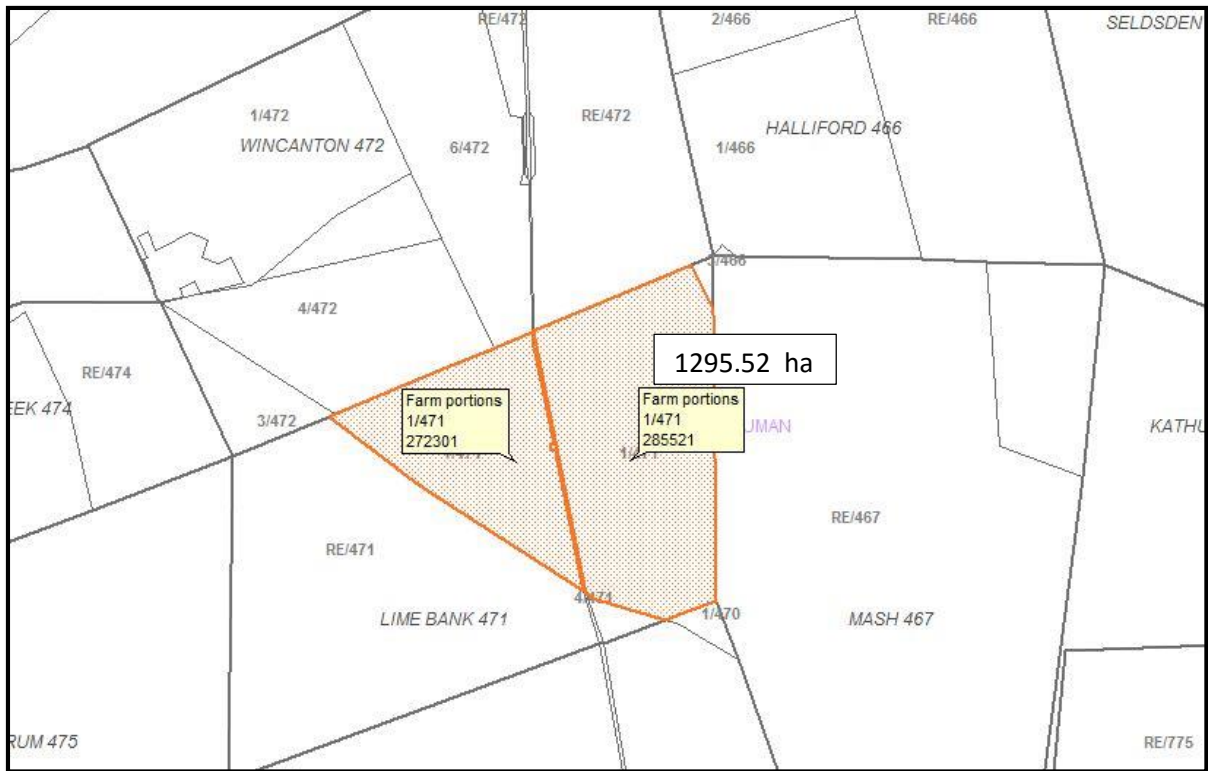


Figure 4: Farm portion (Planet GIS)

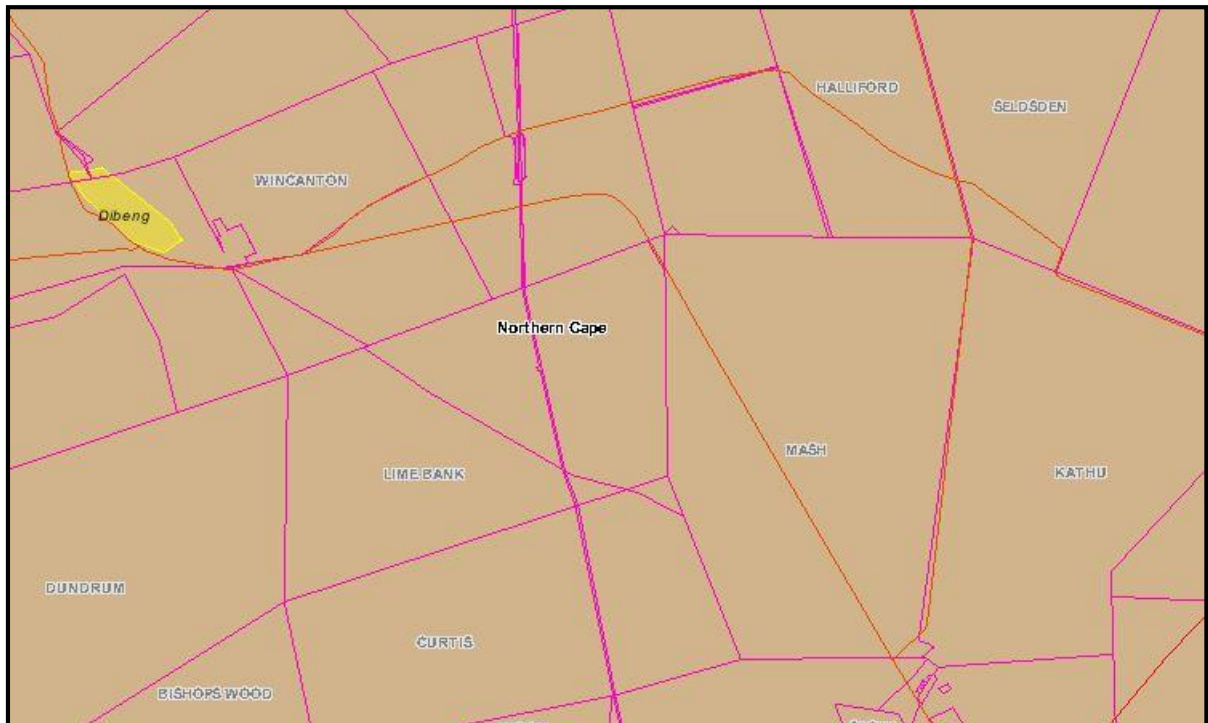


Figure 5: Land Portions (Agis)

## 5. Environmental Impact Assessments conducted in the area

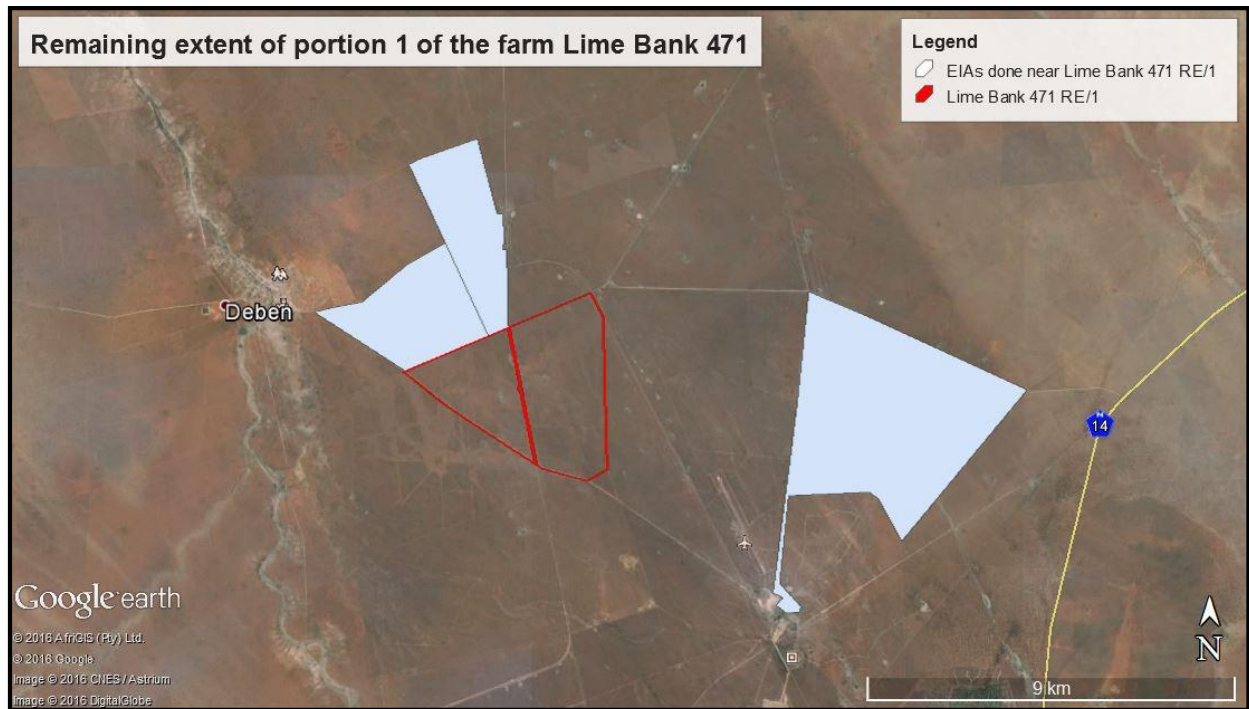


Figure 6: EIA's conducted in the area

### Kathu Solar Energy Facility 25MW 2

12/12/20/1858/2/AM1	
PRJ_REF	12/12/20/1858/2/AM1
ARCHIVE	Active
PROVINCE	Northern Cape
LOCAL_MUNI	Gamagara Local Municipality
DISTRICT_M	John Taolo Gaetsewe
TOWN	Deben
AMEND_COMM	Amending contact details, Validity period
APP_DATE	2015/02/02
EA_DATE	2015/02/26
PRJ_TITTLE	Kathu Solar Energy Facility 25MW 2
EA HOLDER	Lokian Trading and Investments
TECHNOLOGY	Solar PV
PRJ_STATUS	APPROVED
EA_PROCESS	Amendment

### Sishen Solar Facility

12/12/20/1860	
PRJ_REF	12/12/20/1860
ARCHIVE	Active
PROVINCE	Northern Cape
LOCAL_MUNI	Gamagara Local Municipality
DISTRICT_M	John Taolo Gaetsewe
TOWN	Deben
AMEND_COMM	Change the Holder of the EA
APP_DATE	2011/09/11
EA_DATE	2012/03/01
PRJ_TITTLE	Sishen Solar Facility
EA HOLDER	Windfall 59 Properties (RF) Pty Ltd
TECHNOLOGY	Solar PV
PRJ_STATUS	PB_R2
EA_PROCESS	Scoping and EIA

### The Proposed Construction of Kalahari Solar Power Project On the Farm Kathu 465, Northern Cape Province

12/12/20/1994/AM2	
PRJ_REF	12/12/20/1994/AM2
ARCHIVE	Inactive
PROVINCE	Northern Cape
LOCAL_MUNI	Gamagara Local Municipality
DISTRICT_M	John Taolo Gaetsewe
TOWN	Gamagara Rural
AMEND_COMM	extension to validity period
APP_DATE	2012/03/28
EA_DATE	2012/08/31
PRJ_TITTLE	The Proposed Construction of Kalahari Solar Power Project On the Farm Kathu 465, Northern Cape Province
EA HOLDER	Group Five Pty Ltd
TECHNOLOGY	Solar PV
PRJ_STATUS	APPROVED
EA_PROCESS	Amendment



## 6. Natural Resources

### 6.1. Geology

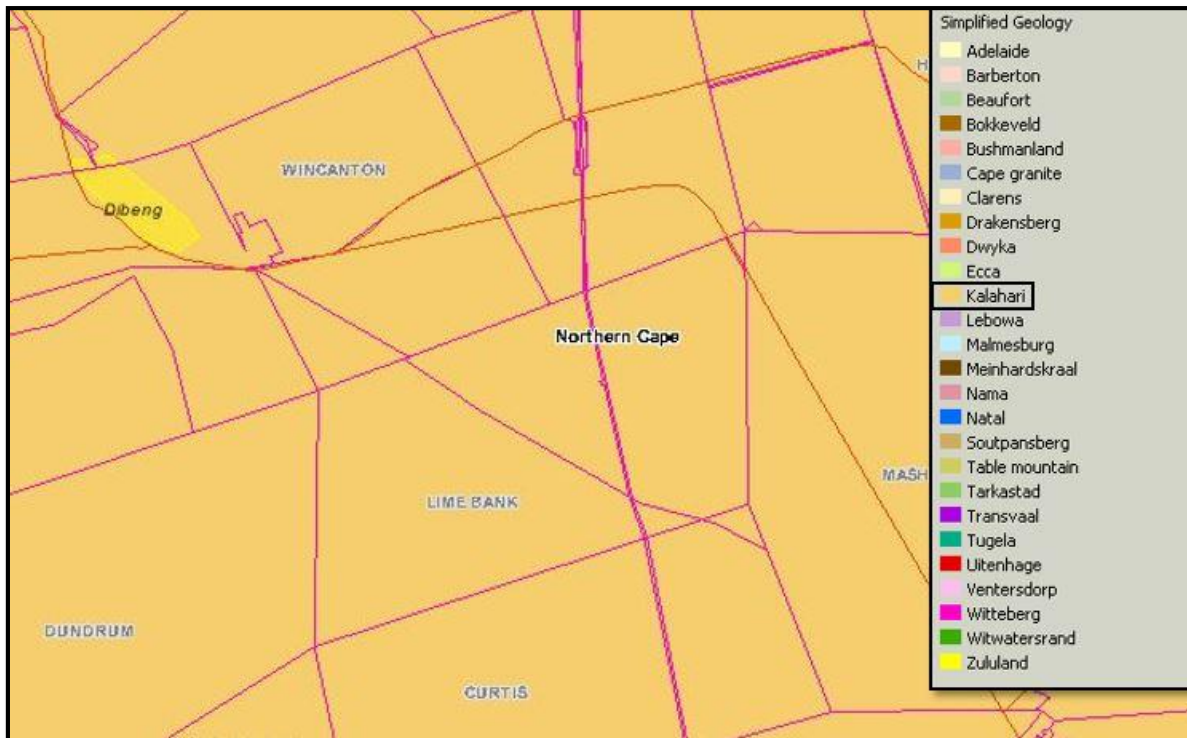


Figure 7: Simplified Geology (Agis)

### 6.2. Terrain

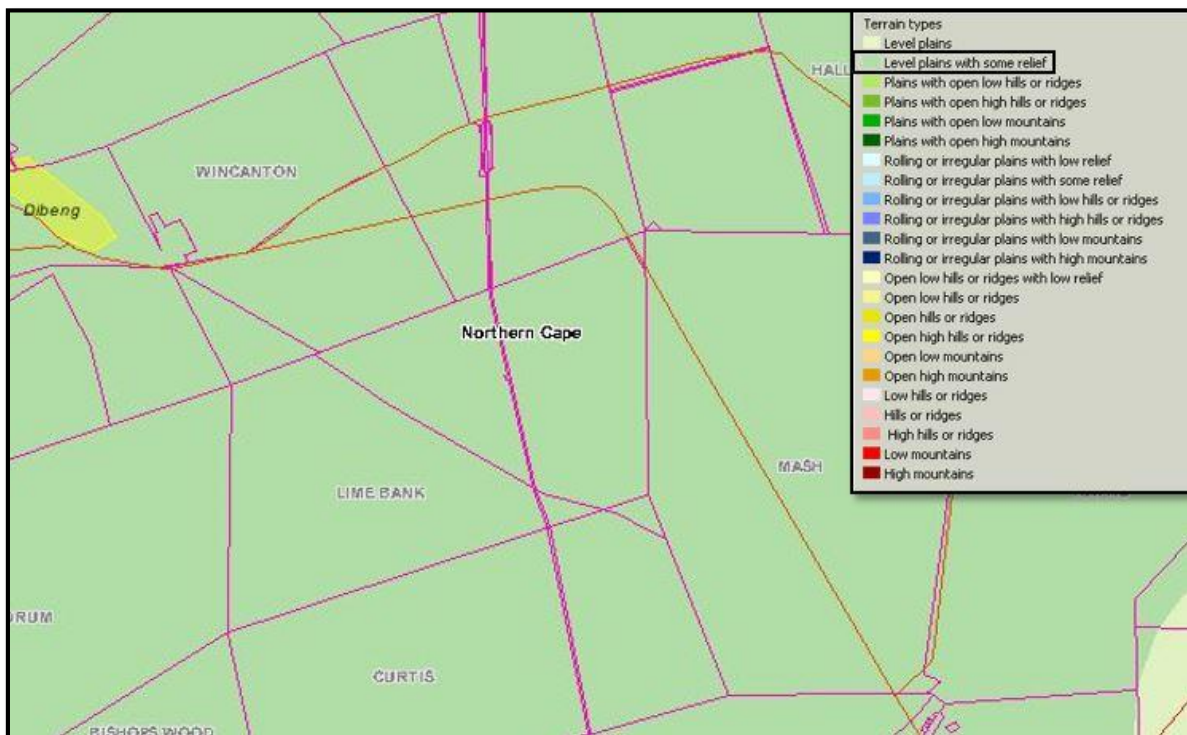


Figure 8: Terrain type (Agis)

### 6.3. Vegetation:



Figure 9: Vegetation biome (Agis)

### 6.4. Water

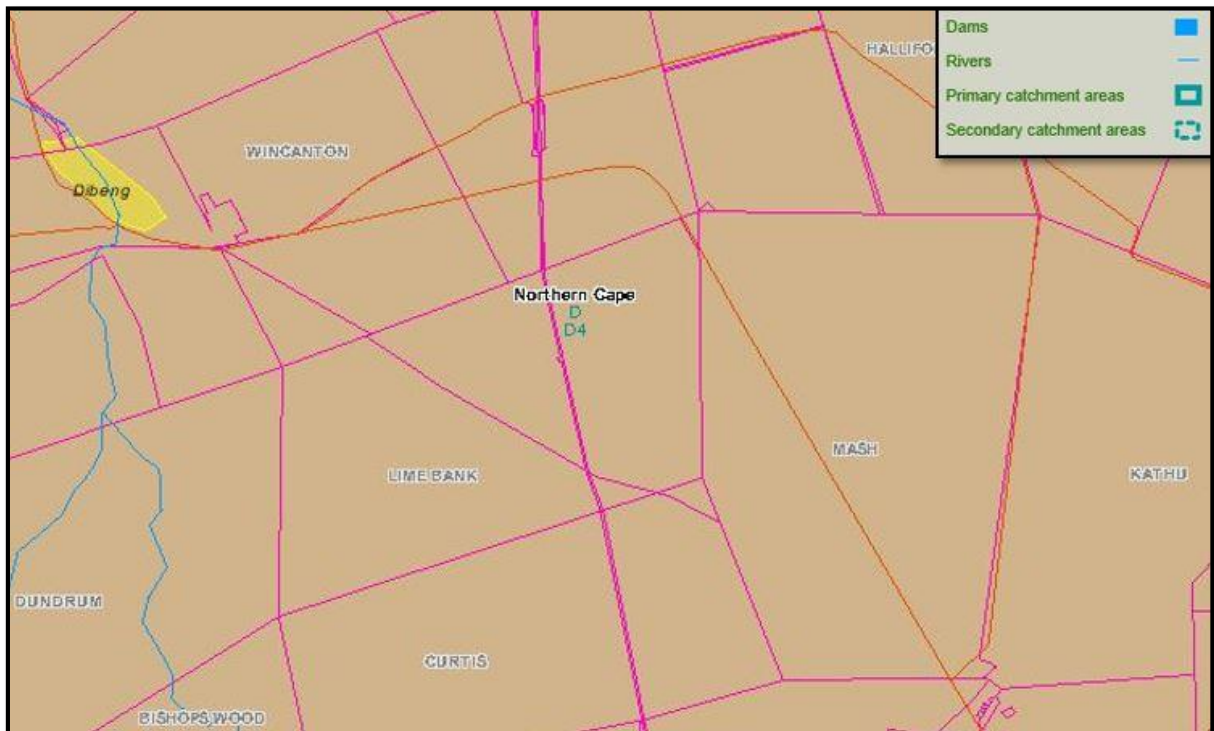


Figure 10: Dams and rivers (Agis)

## 7. Agricultural Potential

### 7.1. Land capability

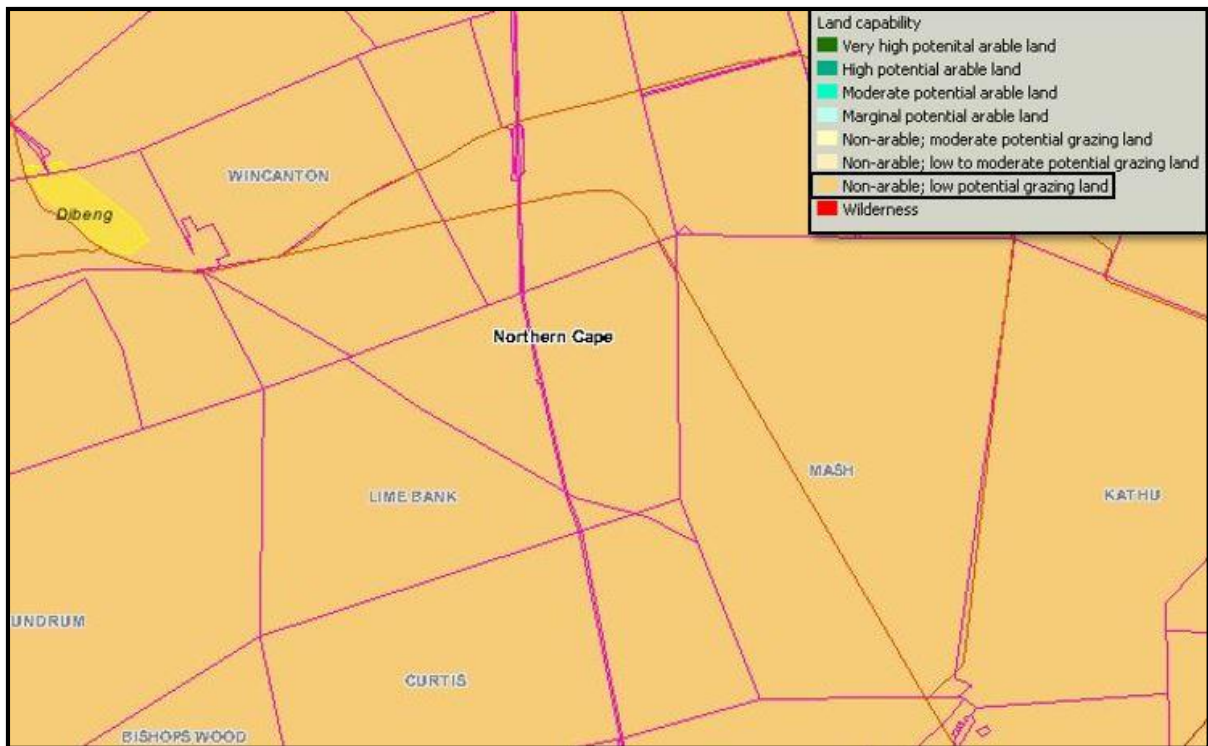


Figure 11: Land Capability (Agis)

### 7.2. Livestock

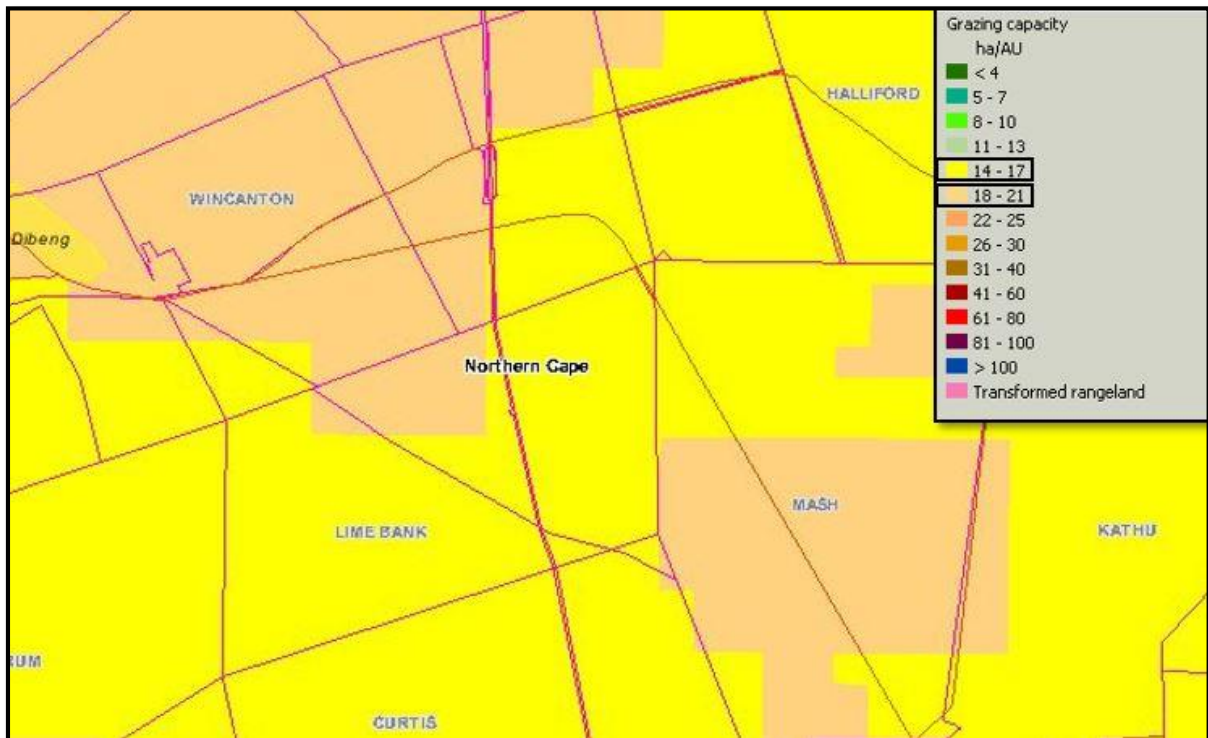


Figure 12: Grazing Capacity (Agis)



## 8. Land cover and Land use

### 8.1. Land use

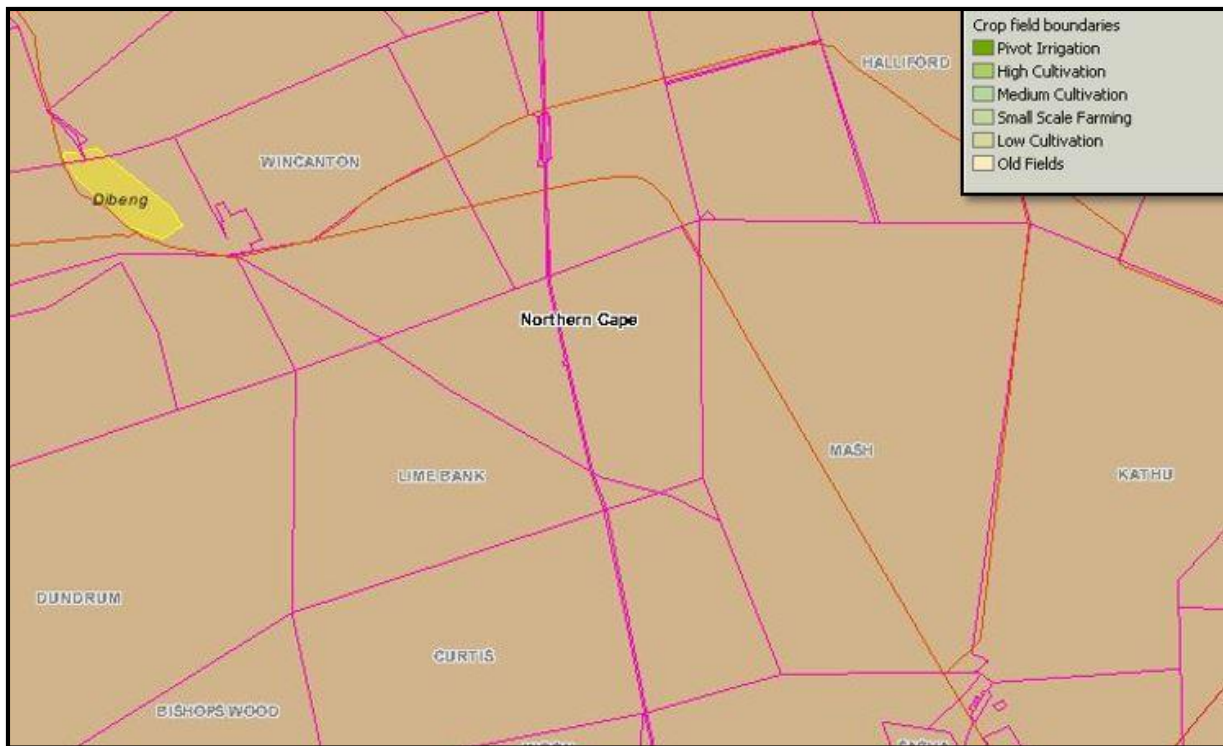


Figure 13: Crop field boundaries (Agis)

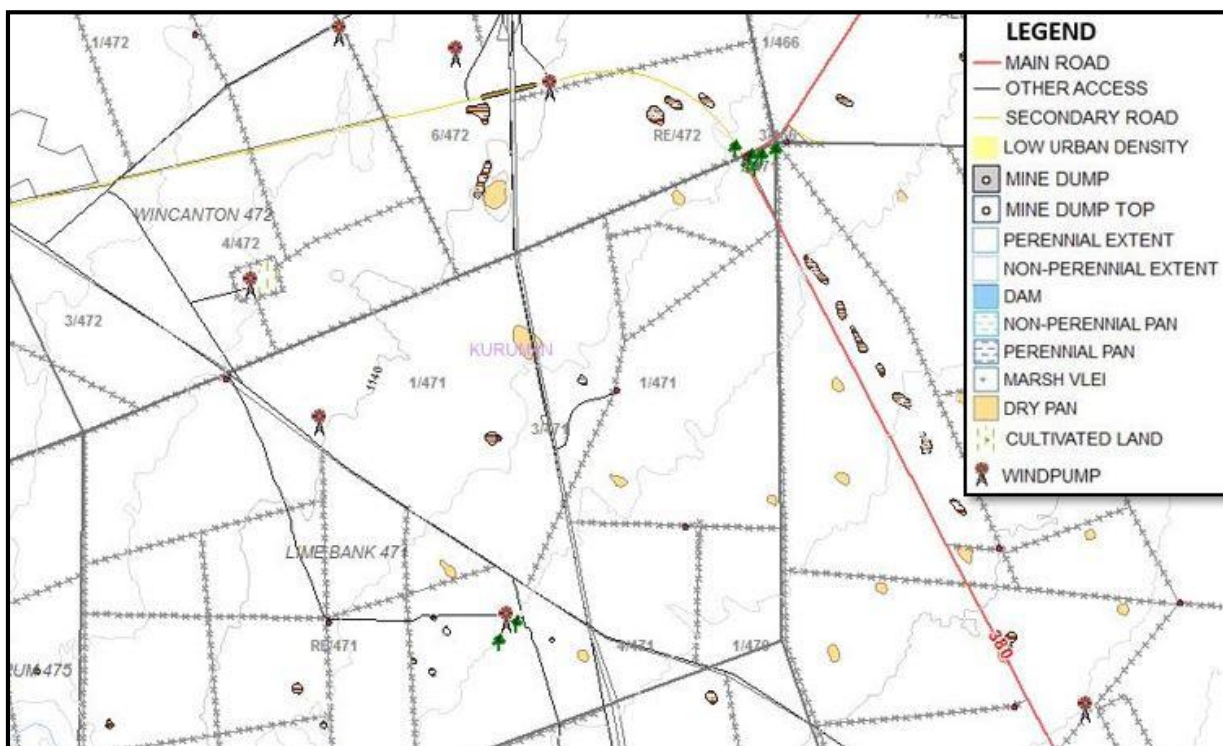
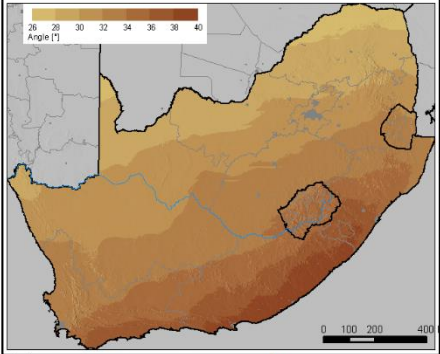


Figure 14: Vegetation and structures (PlanetGIS)

## 9. Solar Resource

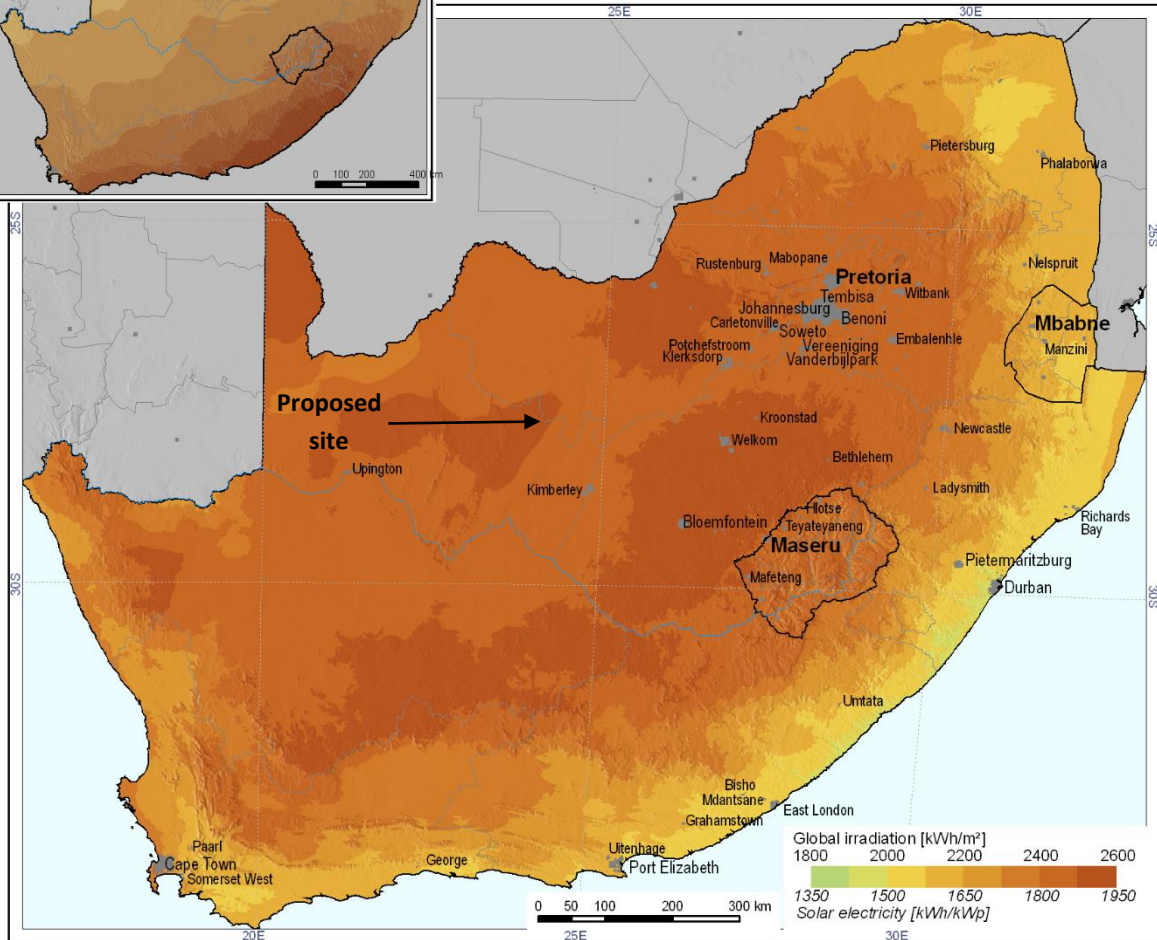
The  $E_m$  for this site is 1887 kWh/kWp (solar panels free standing 1 angle) per year and 2336 kWh/kWp (solar panels on a horizontal North-South Axis) per year.

Optimum inclination of PV modules to maximize yearly energy yield



## South Africa

Yearly sum of global irradiation incident on optimally-inclined surface  
 Yearly sum of solar electricity generated by 1 kWp system with optimally-inclined modules and performance ratio 0.75



PVGIS © European Communities, 2001-2006  
 HelioClim-1 © Ecole des Mines de Paris/ARMINES, 2001-2006

<http://re.jrc.ec.europa.eu/pvgis/pv/>  
<http://www.helioclim.org/>

Figure 15: Global irradiation



## 10. Possible areas for development

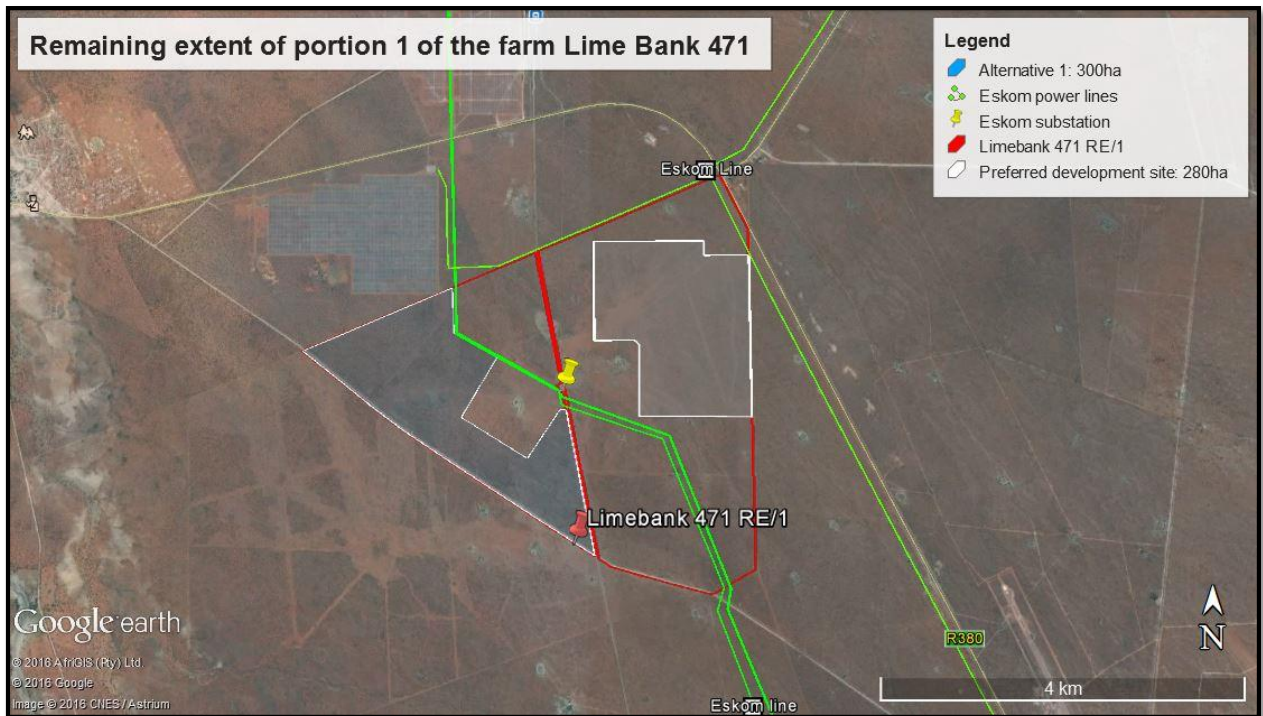


Figure 16: Proposed development area for a solar power plant

Two possible areas were identified for a proposed solar plant. Each of these portions are more than 280ha in extent. The areas identified are as follows:

**Preferred development site (white portion):** This is the preferred option since there are no few small pans near the site and the terrain is flat. This area would also require the shortest power line and access route to be created.

**Alternative 1 (blue portion):** This option contains more pans closer to the site and this option would also require a longer power line route to connect to the grid. This option would require a long access route to be created.

Keeping all the above information into consideration, the white portion would be the preferred option for the development of a solar plant. This area was identified due to the low impact on the environment and infrastructure of the land portion.

**Reference:**

AGIS. 2007. Agricultural Geo-Referenced Information System, accessed from [www.agis.agric.za](http://www.agis.agric.za) on 15-09-2015

SOLARGIS. 2016. SolarGIS GeoModal Solar, accessed from <http://solargis.info/pvplanner/#tl=Google:hybrid&bm=satellite> on 04-04-2016

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